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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s):	ROBERT RASMUSSEN JIANPING YANG	**Group Art Unit:**	1775
Serial No.:	09/589,055		
Filed:	June 7, 2000	**Examiner:**	A. Piziali
Title:	Method for Binding Phosphor Particles in a Field Emission Display Device	**Docket No.**	2008.002800

BOX AF
Assistant Commissioner for Patents
Board of Patent Appeals & Interferences
Washington, D.C. 20231

CERTIFICATE OF MAILING UNDER 37 C.F.R. § 1.8
I hereby certify that this correspondence is being deposited with the U.S. Postal Service with sufficient postage as First-Class Mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231, on the date below:

3/28/2003 Kathryn Adams
Date Signature

APPEAL BRIEF

Dear Sir:

Applicant hereby submits an original and two copies of this Appeal Brief to the Board of Patent Appeals and Interferences in response to the final rejection mailed on September 30, 2002.

Enclosed is a check in the amount of $320.00 to cover cost for filing this Appeal Brief. If the check is inadvertently omitted, or should any additional fees under 37 C.F.R. §§ 1.16 to 1.21 be required for any reason relating to the enclosed materials, or should an overpayment be included herein, the Assistant Commissioner is authorized to deduct or credit said fees from or to Williams, Morgan & Amerson, P.C. Deposit Account No. **50-0786/2008.002800.**

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I. REAL PARTY IN INTEREST

The real party in interest is Micron Technology, Inc. The assignment of this patent application is recorded at Reel 010846, Frame 0582.

II. RELATED APPEALS AND INTERFERENCES

Applicant is not aware of any related appeals and/or interferences that might affect the outcome of this proceeding.

III. STATUS OF THE CLAIMS

Claims 16-37 and 48-54 have been finally rejected and the final rejection of these claims is the subject of this appeal.

IV. STATUS OF AMENDMENTS

Claims 16-37 and 48-54 are pending in the present application. No amendments were made to the pending claims after the Final Office Action dated September 30, 2002. The claims as currently pending are attached as Appendix A.

V. SUMMARY OF THE INVENTION

Generally, the present invention relates to a method for binding phosphor particles in a flat panel display, such as a field emission display (FED) device. The field emission display uses electron emissions to illuminate a luminescent display screen and generate a visual image. An individual field emission pixel typically includes a faceplate, having the display screen formed thereon, and emitter sites formed on a base plate. When a voltage differential is established between the emitter sites and the grid, electron emission is initiated. The emitted electrons pass through an evacuated space and strike phosphor particles contained on

the display screen. The phosphor particles are excited to a higher energy level and release photons to form an image on the display screen.

The phosphor particles on the faceplate are typically bound together with a binder material, as well as bound to the faceplate, to prevent the phosphor particles from becoming scattered as a result of the bombardment of electrons emitted from the emitters. The binder material, which typically includes potassium silicate, is dissolved in water to form a binder solution that is applied to the faceplate. If the phosphor particles are not adequately bound together, the particles will shed from the faceplate, thereby adversely affecting the operation of the display. In particular, FED devices tend to be intolerant of phosphor particle shedding because the loose phosphor particles typically affect the operation of the emitters on the base plate upon which the phosphor particles typically fall, as described at lines 16-22 on page 8 of the Patent Application.

Thus, Applicants disclose, and claim in independent claims 16, 31, and 48, binding the phosphor particles to a substrate by submerging the substrate into a binder solution and removing the substrate from the binder solution at a predetermined rate. For example, at lines 4-17 on page 10 of the Patent Application, Applicants describe submerging a faceplate having phosphor particles applied thereon in a binder solution and then removing the faceplate at a slow-controlled rate. Applicants have discovered that by removing the phosphor particle bound substrate from the binder solution at a predetermined rate causes the phosphor particles disposed thereon to bind stronger to each other and to the substrate itself.

VI. ISSUES ON APPEAL

Appellant respectfully requests that the Board review and overturn the one rejection present in this case. The following issue is presented on appeal in this case: Are claims 16-37 and 48-54 anticipated by Janning (U.S. Pat. No. 5,982,082)?

VII. GROUPING OF THE CLAIMS

For the issue presented above, claims 16-37 and 48-54 can be considered to stand or fall together.

VIII. ARGUMENT

Claims 16-37 and 48-54 are not anticipated by Janning.

Janning discloses a field emission display device wherein a field emitter cathode matrix is opposed by a phosphor-coated, transparent faceplate that serves as an anode of the field emission display device. Janning further discloses that a barrier layer in the form of a thin film of insulator material (such as a thin silicon nitride layer) is applied directly to the phosphor material to permit the tunneling of electrons but inhibit the flow of ions or scattering of the phosphors within the device when it is activated (see Janning, col. 6, line 60 – col. 7, line 2). Applicants respectfully submit that Janning does not disclose or suggest binding the phosphor particles to a substrate by submerging the substrate into a binder solution and removing the substrate from the binder solution at a predetermined rate.

In the Final Office Action, the Examiner states that even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product. Thus, the Examiner' position is that the patentability of the product does not depend on its method of production. Applicants respectfully disagree. In at least one Federal Circuit case, the court stated that, "In light of Supreme Court case law and the history of product-by-process claims, this court acknowledges that infringement analysis proceeds with reference to the patent claims. Thus, process terms in product-by-process claims serve as limitations in determining infringement." *Atlantic Thermoplastics v. Faytex Corp.*, 970 F.2d

834, 846 (Fed. Cir. 1992). If process terms in product-by-process claims serve as limitations in determining infringement, Applicants respectfully submit that process terms in product-by-process claims must also serve as limitations in determining patentability.

Applying this legal principle to the present case, Applicants respectfully submit that Janning does not disclose each and every limitation of the present invention. The Examiner acknowledges at item 7 on page 4 of the Final Office Action that the process described and claimed by Applicants is materially different than the process described by Janning. In particular, Janning does not describe or suggest submerging the substrate into a binder solution and removing the substrate from the binder solution at a predetermined rate. For at least this reason, Applicants respectfully submit that Janning does not anticipate claims 16-37 and 48-54 of the present invention.

Furthermore, Applicants respectfully submit that the product formed by the process disclosed in Janning cannot be substantially identical to the product formed by Applicants' claimed process because the two structures have substantially different properties, *e.g.*, the strength of the phosphor particle bonds to each other and to the substrate. As stated above, Applicants have discovered that the process of removing the substrate from the binder solution at a predetermined rate improves the adherence of the phosphor particles to each other, as well as to the faceplate. See Patent Application, pg. 11, ll. 15-19. Accordingly, Applicants respectfully submit that these claims cannot possibly be anticipated by Janning.

IX. CONCLUSION

In view of the foregoing arguments, Applicants respectfully request that the board of Patent Appeals and Interferences reverse the decision rejecting claims 16-37 and 48-54 and direct the Examiner to pass the case to issue.

Respectfully submitted,

Date: 3-28-03

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AGENT FOR APPLICANTS

APPENDIX A

The claims on appeal are:

16. A phosphor particle bounded substrate formed by a method comprising:

applying phosphor particles to the substrate;

submerging the substrate into a binder solution; and

removing the substrate from the binder solution at a predetermined rate.

17. The substrate of claim 16, wherein removing the substrate from the binder solution at a predetermined rate further comprises:

removing the substrate from the binder solution at a rate of about one inch per minute.

18. The substrate of claim 16, further comprising:

placing the substrate into a furnace to fire the substrate.

19. The substrate of claim 16, wherein submerging the substrate into the binder solution, further comprises:

submerging the substrate into a solution of potassium silicate and water.

20. The substrate of claim 19, wherein submerging the substrate into a solution of potassium silicate and water, further comprises:

submerging the substrate into a solution of about 0.1 to 0.5% by weight of potassium silicate dissolved in water.

21. The substrate of claim 16, wherein submerging the substrate into the binder solution, further comprises:

submerging the substrate into a solution containing water and at least one of potassium silicate, sodium silicate, ammonium silicate and polyvinyl alcohol.

22. The substrate of claim 16, wherein submerging the substrate into the binder solution, further comprises:

submerging the substrate into a solution containing alcohol and organo-silicate.

23. The substrate of claim 18, wherein placing the substrate into a furnace to fire the substrate, further comprises:

placing the substrate into a furnace to heat the substrate to a temperature between about 400° and 700°C.

24. The substrate of claim 16, where in submerging the substrate into the binder solution, further comprises:

placing the substrate into a furnace to heat the substrate to a temperature between about 400° and 500°C.

25. The substrate of claim 16, wherein applying phosphor particles to a substrate, further comprises:

submerging the substrate in a non-aqueous solution with dispersed phosphor particles.

26. The substrate of claim 25, wherein submerging the substrate in a non-aqueous solution with dispersed phosphor particles, further comprises:

submerging the substrate in an isopropyl alcohol solution with dispersed phosphor particles, an electrolyte and glycerol.

27. The substrate of claim 26, wherein submerging the substrate in an isopropyl alcohol solution with dispersed phosphor particles and an electrolyte, further comprises:

submerging the substrate in an isopropyl alcohol solution with dispersed phosphor particles and indium nitrate.

28. The substrate of claim 26, wherein submerging the substrate in an isopropyl alcohol solution with dispersed phosphor particles and an electrolyte, further comprises:

submerging the substrate in an isopropyl alcohol solution with dispersed phosphor particles and cerium nitrite.

29. The substrate of claim 26, wherein submerging the substrate in an isopropyl alcohol solution with dispersed phosphor particles and an electrolyte, further comprises:

submerging the substrate in an isopropyl alcohol solution with dispersed phosphor particles and thorium nitrite.

30. The substrate of claim 25, wherein submerging the substrate in a non-aqueous solution with dispersed phosphor particles, further comprises:

adding an electrolyte to the non-aqueous solution; and

applying a voltage to the substrate and a counter electrode.

31. A phosphor particle bounded substrate, comprising:

a substrate having first and second surfaces;

an anode electrode formed on the first surface of the substrate;

a fluorescent material layer (FML) formed on the anode electrode, the FML having phosphor particles disposed therein;

wherein the phosphor particles are bound to the substrate by submerging the substrate into a binder solution and removing the substrate from the binder solution at a predetermined rate.

32. The phosphor particle bounded substrate of claim 31, wherein the binder solution comprises a solution of approximately 0.1%-2.0 % by body weight potassium silicate in water.

33. The phosphor particle bounded substrate of claim 31, wherein the binder solution comprises water and at least one of potassium silicate, sodium silicate, ammonium silicate and polyvinyl alcohol.

34. The phosphor particle bounded substrate of claim 31, wherein the binder solution comprises alcohol and organo-silicate.

35. The phosphor particle bounded substrate of claim 31, wherein the predetermined rate is approximately one inch per minute.

36. The phosphor particle bounded substrate of claim 31, wherein the phosphor particles are bound to the substrate by submerging the substrate into a binder solution,

removing the substrate from the binder solution at a predetermined rate, and placing the substrate into a furnace to heat the substrate to a temperature between about 400° and 700° C.

37. The phosphor particle bounded substrate of claim 36, wherein the substrate is heated to a temperature between about 400° and 500° C.

48. A substrate, comprising:

an anode electrode formed on a first surface of the substrate; and

a fluorescent material layer (FML) formed on the anode electrode, the FML having phosphor particles that are bound to the anode electrode by removing the substrate from a binder solution at a predetermined rate.

49. The substrate of claim 48, wherein the binder solution comprises a solution of approximately 0.1%-2.0 % by body weight potassium silicate in water.

50. The substrate of claim 48, wherein the binder solution comprises water and at least one of potassium silicate, sodium silicate, ammonium silicate and polyvinyl alcohol.

51. The substrate of claim 48, wherein the binder solution comprises alcohol and organo-silicate.

52. The substrate of claim 48, wherein the predetermined rate is approximately one inch per minute.

53. The substrate of claim 48, wherein the phosphor particles are bound to the substrate by submerging the substrate into a binder solution, removing the substrate from the binder solution at a predetermined rate, and placing the substrate into a furnace to heat the substrate to a temperature between about 400° and 700° C.

54. The substrate of claim 53, wherein the substrate is heated to a temperature between about 400° and 500° C.